

(19) World Intellectual Property Organization
International Bureau



20 AUG 2004



(43) International Publication Date
28 August 2003 (28.08.2003)

PCT

(10) International Publication Number
WO 03/071283 A1

(51) International Patent Classification⁷: G01N 271/327, C12Q 1/00, 1/26, 1/32, H01M 6/00

(21) International Application Number: PCT/GB03/00751

(22) International Filing Date: 21 February 2003 (21.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0204232.3 22 February 2002 (22.02.2002) GB

(71) Applicant (for all designated States except US): **ISIS INNOVATION LIMITED** [GB/GB]; Ewert House, Ewert Place, Summertown, Oxford OX2 7SG (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WONG, Luet, Lok** [GB/GB]; University of Oxford, Inorganic Chemistry Laboratory, South Parks Road, Oxford OX1 3QR (GB). **BELL, Stephen** [GB/GB]; University Of Oxford, Inorganic Chemistry Laboratory, South Parks Road, Oxford OX1 3QR (GB).

(74) Agents: **ROQUES, Sarah, Elizabeth**, et al.; J.A. Kemp & Co., 14 South Square, Gray's Inn, London WC1R 5JJ (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ELECTROCHEMICAL DETECTION OF NADH OR NAPH

(57) Abstract: A method for detecting the presence or absence of, or for determining the concentration of, NADH or NADPH in a sample is provided, wherein the method comprises - contacting a reductase and a redox active agent to said sample; and - measuring the quantity of reduced redox active agent produced by the reductase, by electrochemical means. The method may be used to quantify the amount or activity of a redox enzyme or its substrate, wherein the redox enzyme uses NAD⁺, NADP⁺, NADPH or NADP as a cofactor.

WO 03/071283 A1

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/00751

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N27/327 C12Q1/00 C12Q1/26 C12Q1/32 H01M6/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12Q G01N H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 196 19 056 A (SCHELLER FRIEDER PROF) 25 September 1997 (1997-09-25) the whole document ---	1-16
X	US 5 783 056 A (HAMPP NORBERT ET AL) 21 July 1998 (1998-07-21) the whole document ---	1-16
X	US 5 122 244 A (SCHAEFFLER JURGEN ET AL) 16 June 1992 (1992-06-16) the whole document ---	1-16
A	EP 0 846 948 A (BAYER AG) 10 June 1998 (1998-06-10) abstract; examples ---- -/--	1,15

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

5 August 2003

Date of mailing of the international search report

13/08/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Moreno, C

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/00751

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
---	---------------------	----------------------------	---------------------

US 5306413

A

GB

2265718 A ,B

06-10-1993

JP

3319008 B2

26-08-2002

JP

6018478 A

25-01-1994

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/00751

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19619056	A	25-09-1997	DE 19619056 A1	25-09-1997
US 5783056	A	21-07-1998	DE 4442253 A1	30-05-1996
			CA 2163816 A1	29-05-1996
			DE 59508908 D1	25-01-2001
			EP 0714985 A1	05-06-1996
			JP 8220055 A	30-08-1996
US 5122244	A	16-06-1992	DE 4003194 A1	08-08-1991
			AT 146524 T	15-01-1997
			AU 638899 B2	08-07-1993
			AU 2108692 A	15-10-1992
			AU 632659 B2	07-01-1993
			AU 7018391 A	08-08-1991
			BG 60694 B1	29-12-1995
			CA 2035630 A1	04-08-1991
			CN 1054666 A ,B	18-09-1991
			CS 9100261 A2	15-09-1991
			DE 59108414 D1	30-01-1997
			EP 0441222 A2	14-08-1991
			ES 2097767 T3	16-04-1997
			FI 910498 A	04-08-1991
			HU 59756 A2	29-06-1992
			IE 910343 A1	14-08-1991
			IL 97121 A	31-10-1995
			JP 2708281 B2	04-02-1998
			JP 4213051 A	04-08-1992
			KR 9408083 B1	01-09-1994
			MX 24356 A	28-02-1994
			NO 910394 A	05-08-1991
			NZ 236931 A	27-06-1994
			NZ 247446 A	27-06-1994
			PL 288920 A1	07-09-1992
			PL 168285 B1	31-01-1996
			PT 96636 A	31-10-1991
			US 5286362 A	15-02-1994
			ZA 9100757 A	28-10-1992
EP 0846948	A	10-06-1998	US 5866353 A	02-02-1999
			AU 726868 B2	23-11-2000
			AU 4760297 A	11-06-1998
			CA 2224034 A1	09-06-1998
			EP 0846948 A1	10-06-1998
			JP 10165199 A	23-06-1998
US 5393615	A	28-02-1995	AT 206466 T	15-10-2001
			AU 674463 B2	19-12-1996
			AU 8028094 A	10-08-1995
			CA 2141494 A1	04-08-1995
			DE 69522975 D1	08-11-2001
			DE 69522975 T2	04-04-2002
			EP 0667397 A1	16-08-1995
			ES 2161787 T3	16-12-2001
			JP 7310194 A	28-11-1995
US 5264092	A	23-11-1993	NONE	
US 5306413	A	26-04-1994	DE 4310322 A1	07-10-1993

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/00751

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 393 615 A (COREY PAUL F ET AL) 28 February 1995 (1995-02-28) abstract; examples ----	1, 15
A	US 5 264 092 A (SKOTHEIM TERJE ET AL) 23 November 1993 (1993-11-23) abstract; examples ----	1, 15
A	US 5 306 413 A (HAYASHI RYUZO ET AL) 26 April 1994 (1994-04-26) abstract; examples -----	1, 15